VA/DOD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF ISCHEMIC HEART DISEASE GUIDELINE SUMMARY MODULE G

MEDICAL FOLLOW-UP AND SECONDARY PREVENTION SUMMARY

Patients who have a history of ischemic heart disease (IHD) are candidates for secondary prevention of further coronary events. These include patients with prior myocardial infarction (MI), ischemic cardiomyopathy, silent ischemia, segmental wall motion abnormality by left ventricular (LV) angiography or cardiac ultrasound, positive stress test, prior coronary revascularization, pathologic Q-waves on the resting electrocardiogram (ECG), and males greater than age 50 with typical angina.

This guideline emphasizes the assessment of clinical predictors for progression of IHD and identifies areas for which there are effective interventions. It also emphasizes that all patients are on optimal doses of pharmacological therapies with proven morbidity and mortality benefits, and that patients are assessed for possible benefits from a revascularization procedure.

This guideline also emphasizes the assessment for coronary artery disease risk factors, where interventions are known to reduce the likelihood of future coronary events (particularly smoking, diabetes, dyslipidemia, and hypertension). Although the evidence of benefit is less strong, the diagnosis and treatment of depression and promotion of cardiac rehabilitation are also discussed.

KEY ELEMENTS

Management of Medical Follow-Up

- Identify and triage IHD patients with a possible acute coronary syndrome (i.e., ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI), or unstable angina).
- Assess if stable symptoms are due to non-cardiac conditions.
- Identify and treat other medial conditions that may exacerbate IHD symptoms.
- Ensure all patients receive aspirin (or other antiplatelet therapy, as appropriate).
- Ensure pharmacological therapy for ischemia, angina, and CHF.
- Unless a cardiac cath is completed or planned, perform a cardiac stress test to assess the risk of future cardiac events.
- Initiate ACE inhibitor therapy for patients with significant left ventricular dysfunction (EF <0.40).
- Identify and provide therapy for patients with heart failure.
- Identify patients at high-risk for sudden cardiac death or complications for whom a cardiology referral is appropriate.

Secondary Prevention

- Assure appropriate treatment with beta-blockers in patients with prior MI.
- Identify and treat patients with high LDL-C.
- Assess and treat high blood pressure.
- Reduce cardiac risk with smoking cessation.
- Promote cardiac rehabilitation as secondary prevention.
- Achieve tight glycemic control in diabetics.
- Screen for depression and initiate therapy or refer.
- Arrange follow-up.

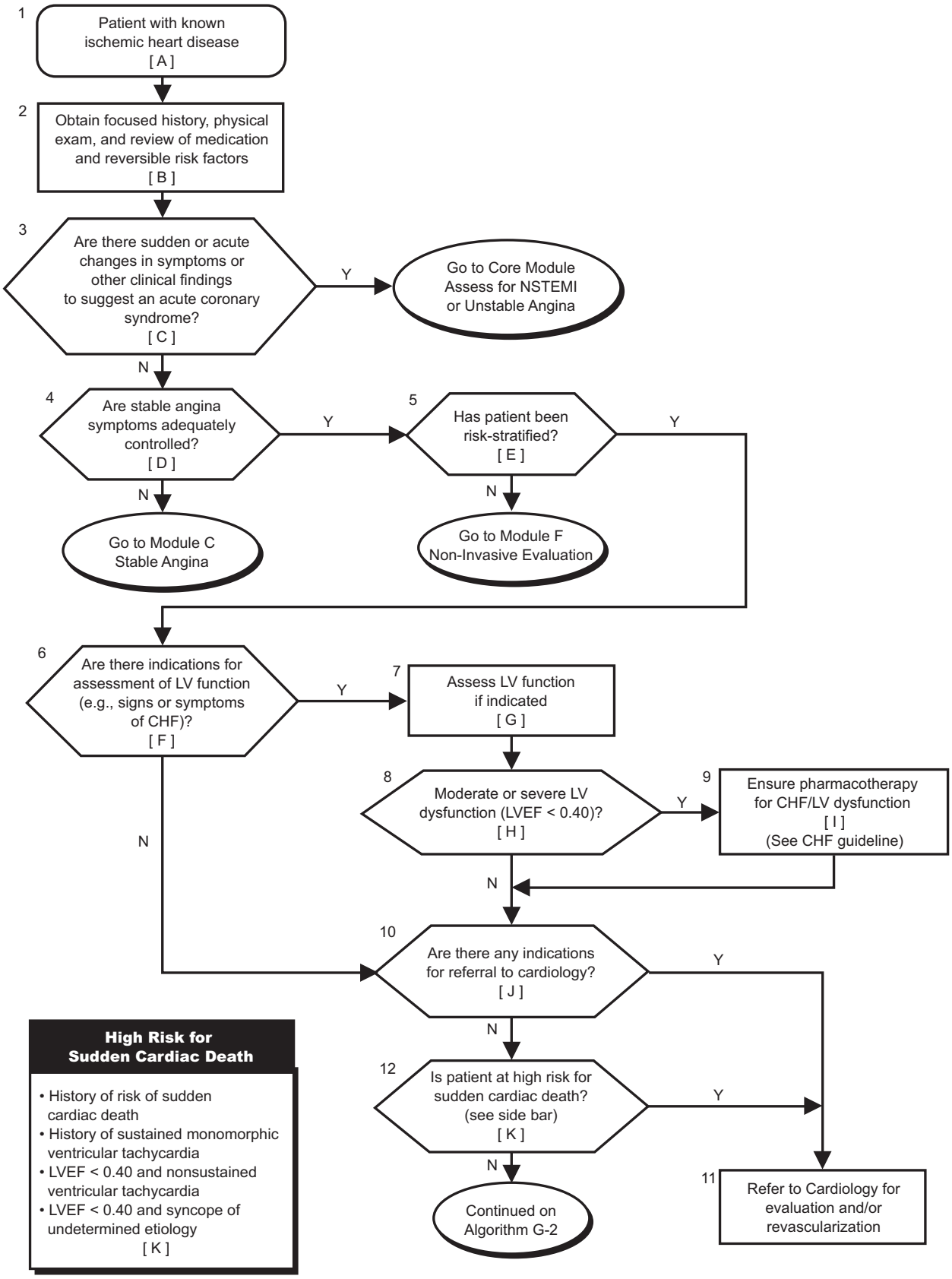
VA access to full guideline: http://www.oqp.med.va.gov/cpg/cpg.htm
DoD access to full guideline: http://www.QMO.amedd.army.mil

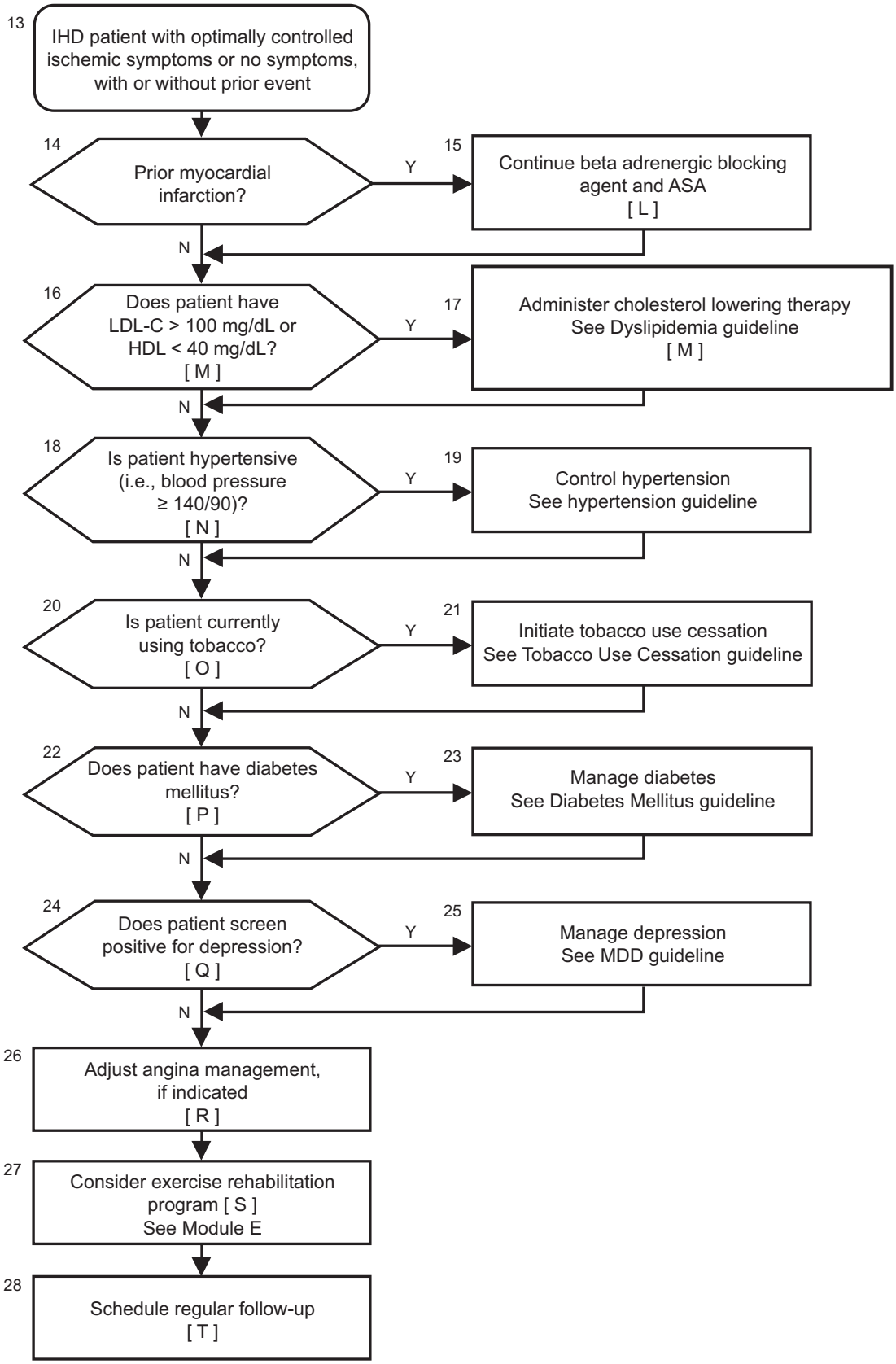
January 2003

Sponsored & produced by the VA Employee Education System in cooperation with the Offices of Quality & Performance and Patient Care Services and the Department of Defense.

MANAGEMENT OF ISCHEMIC HEART DISEASE
Module G: IHD Follow-Up and Secondary Prevention

G1




13
IHD patient with optimally controlled ischemic symptoms or no symptoms, with or without prior event
14
Prior myocardial infarction?
Y
15
Continue beta adrenergic blocking agent and ASA
[L]
N
16
Does patient have LDL-C > 100 mg/dL or HDL < 40 mg/dL?
[M]
Y
17
Administer cholesterol lowering therapy
See Dyslipidemia guideline
[M]
N
18
Is patient hypertensive (i.e., blood pressure ≥ 140/90)?
[N]
Y
19
Control hypertension
See hypertension guideline
N
20
Is patient currently using tobacco?
[O]
Y
21
Initiate tobacco use cessation
See Tobacco Use Cessation guideline
N
22
Does patient have diabetes mellitus?
[P]
Y
23
Manage diabetes
See Diabetes Mellitus guideline
N
24
Does patient screen positive for depression?
[Q]
Y
25
Manage depression
See MDD guideline
N
26
Adjust angina management, if indicated
[R]
27
Consider exercise rehabilitation program [S]
See Module E
28
Schedule regular follow-up
[T]

MEDICAL FOLLOW-UP AND SECONDARY PREVENTION

Candidates for secondary prevention of ischemic heart disease (IHD) are patients who have a history of clinical coronary disease.

Accepted criteria for a diagnosis of coronary artery disease (CAD) include the following:

- Prior myocardial infarction (MI) and/or pathologic Q-waves on the resting electrocardiogram (ECG)
- Typical stable angina in males > age 50
- Cardiac stress test showing evidence of myocardial ischemia
- Left ventricular (LV) segmental wall motion abnormality by angiography or cardiac ultrasound
- Silent ischemia, defined as reversible ST-segment depression by ambulatory ECG monitoring
- Significant obstructive CAD by angiography
- Prior coronary revascularization (percutaneous coronary intervention or coronary artery bypass graft surgery)

ASSESS AND DETECT CHANGES IN CLINICAL STATUS

Stable patients with IHD may experience sudden or acute changes in their clinical status (i.e., ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI), or unstable angina). The diagnosis of ACS may be suspected on the basis of a compelling clinical history, specific ECG findings, and/or elevations in serum markers of cardiac necrosis. The following presents a logical means by which the primary care provider may decide if the patient has an acute coronary syndrome (ACS), and therefore, be referred to specific management for Acute Coronary Syndrome.

Symptoms that may represent an acute coronary syndrome

The following may be symptoms of myocardial ischemia. If they are new or are occurring in an accelerating fashion, they should prompt consideration of a possible ACS.

- Chest pain, discomfort, pressure, tightness, or heaviness (at least a one-class increase in the Canadian Cardiovascular Society (CCS) classification
- Radiating pain to the neck, jaw, arms, shoulders, or upper back
- Unexplained or persistent shortness of breath
- Unexplained epigastric pain
- Unexplained indigestion, nausea, or vomiting
- Unexplained diaphoresis
- Unexplained weakness, dizziness, or loss of consciousness

DIAGNOSIS OF ACS

A diagnosis of ACS is made if at least *one major criterion* or *at least one minor criterion from both columns I and II* is present

Major Criteria *A diagnosis of an ACS can be made if one or more of the following major criteria is present*	Minor Criteria *In the absence of a major criterion, a diagnosis of ACS requires the presence of at least one item from both columns*	
	I	**II**
• ST-elevation[a] or LBBB in the setting of recent (<24 hours) or ongoing angina • New, or presumably new, ST-segment depression (≥0.05 mV) or T-wave inversion (≥0. 2 mV) with rest symptoms • Elevated serum markers of myocardial damage (i.e., troponin I, troponin T, and CK-MB)	• Prolonged (i.e., >20 minutes) chest, arm, or neck discomfort • New onset chest, arm or neck discomfort during minimal exertion or ordinary activity (CCS class III or IV) • Previously documented chest, arm, or neck discomfort which has become distinctly more frequent, longer in duration, or lower in precipitating threshold (i.e., increased by ≥1 CCS class to at least CCS III severity)	• Typical or atypical angina[b] • Male age > 40 or female age >60[c] • Known CAD • Heart failure, hypotension, or transient mitral regurgitation by examination • Diabetes • Documented extra-cardiac vascular disease • Pathologic Q-waves on ECG • Abnormal ST-segment or T-wave abnormalities not known to be new

[a] ST elevation ≥ 0.2 mV at the J-point in two or more contiguous chest leads V_1, V_2, or V_3; or ≥ 0.1 mV in all other leads. Contiguity in the limb leads (frontal plane) is defined by the lead sequence: aVL, I, inverted aVR, II, aVF, III. (ESC/ACC, 2000)

[b] Use the following definitions to determine the likelihood that the presenting symptoms are angina:

Typical (definite) angina	IF all three of the primary symptom characteristics are present: • Substernal chest or arm discomfort with a *characteristic* quality and duration • Provoked by exertion or emotional stress • Relieved by rest or nitroglycerin
Atypical (probable) angina	IF any two of the above primary three symptom characteristics are present
Probably non-cardiac chest pain	IF provocation by exertion or emotional distress or relief by rest or nitroglycerin are present and one or more symptom characteristics suggesting non-cardiac pain are present
Definitely non-cardiac chest pain	IF none of the primary symptom characteristics are present and one or more symptom characteristics suggesting non-cardiac pain are present

[c] These age and gender characteristics define a probability of CAD ≥ 10 percent in symptomatic patients.

Symptom *characteristics* that suggest non-cardiac pain include the following:

- Pleuritic pain (i.e., sharp or knife-like pain brought on by respiratory movements or cough)
- Primary or sole location of discomfort in the middle or lower abdominal regions
- Pain that may be localized at the tip of one finger, particularly over costochondral junctions or the LV apex
- Pain reproduced with movement or palpation of the chest wall or arms
- Constant pain that lasts for many hours
- Very brief episodes of pain that last a few seconds or less
- Pain that radiates into the lower extremities

Canadian Cardiovascular Society Classification of Angina	
Class I	Angina only with strenuous exertion
Class II	Angina with moderate exertion
Class III	Angina with minimal exertion or ordinary activity
Class IV	Angina at rest or with any physical activity

Adequate Control of Symptoms

Provide the patient with optimal control of his or her symptoms of myocardial ischemia. The level of symptoms that constitute "adequate control" is highly dependent on the following:

- Stage of the CAD.
- Whether or not revascularization is feasible at an acceptable risk.
- Patient's tolerance or intolerance of anti-anginal drugs.
- Patient's preference.

Changes in exercise tolerance and symptoms, over time, are particularly useful in assessing the adequacy of control of myocardial ischemia symptoms. The Canadian Cardiovascular Society (CCS) classification of angina (1994) is useful for the serial assessment of exercise tolerance and anginal symptoms.

MAINTENANCE/MEDICAL THERAPY OF CHRONIC THERAPY OF IHD

Review Medications and Reversible Risk Factors

A focused history should include assessment of risk factors for which interventions can improve outcome. Life-extending therapies, such as beta-blockers after MI, aspirin (ASA), angiotensin-converting enzyme (ACE) inhibitors and lipid-lowering therapy, are under-prescribed in patients with known IHD

Ensure that all patients with LV dysfunction are on optimal doses of pharmacological therapies with proven morbidity and mortality benefits.

Randomized trial evidence has shown a survival benefit for patients with severe congestive heart failure (CHF) and/or severe systolic dysfunction (LVEF <0.35 to 0.40) treated with ACE inhibitors, beta-blockers, or spirono-lactone. No mortality benefit has been found with the use of digoxin in patients with CHF from LV systolic dysfunction. Both ACE inhibitors and beta-blockers have been proven to be beneficial in patients with both mild and more severe CHF. Spironolactone, on the other hand, has only been studied in patients with severe heart failure already on an ACE inhibitor. Because of the more extensive data supporting the use of both ACE inhibitors and beta-blockers, these agents should be initiated prior to initiation of spironolactone.

ACE Inhibitors

ACE inhibitors should be given to all patients, in the absence of recognized contraindications (e.g., angioedema), with CHF or evidence for LV systolic dysfunction (EF <0.40), and all attempts should be made to have patients on at least 20 mg of enalapril, or its equivalent, a day. Angiotensin II receptor blockers should be substituted when there is a contraindication to the use of ACE inhibitors.

Beta-Blockers

In patients with moderate to severe CHF symptoms, beta-blockers have been shown to improve symptoms, New York Heart Association (NYHA) class, and overall morbidity and mortality. Thus far, studies support use of carvedilol, metoprolol, and bisoprolol for this indication. Before using beta-blockers, all patients should be on optimal doses of an ACE inhibitor, as in the clinical trials. Beta-blockers should not be used in uncompen-sated CHF and should be used with great caution in patients with Class IV CHF.

Spironolactone

A randomized trial using a relatively low dose of spironolactone demonstrated significant improvement in outcomes in patients with severe CHF (i.e., Functional Class 3 to 4) who were already on ACE inhibitor therapy. Remarkably, in this trial, the incidence of hyperkalemia was not increased with this dose of spironolactone. The effect of spironolactone in patients with less severe CHF is unknown.

Digoxin

The DIG Study (1997) showed no benefit in terms of mortality, but some reduction in frequency of hospital-ization with the use of digoxin in patients with CHF. Discontinuing digoxin in patients with compensation heart failure often results in worsening of symptoms.

Diuretics

While there is no evidence supporting mortality benefit of diuretics in patients with heart failure, diuretics are useful in the management of symptomatic volume overload.

Medical Therapies

Recommended Medications
Aspirin reduces cardiovascular (CV) events in patients with acute MI, previous MI, and unstable angina.
Aspirin reduces risk of MI in patients with chronic stable angina.
Beta-blockers improve symptoms in patients with IHD.
Beta-blockers improve morbidity and mortality in patients with IHD and previous MI.
Beta-blockers reduce CV events in patients with silent ischemia.
ACE inhibitors for patients with IHD and low ejection fraction (EF) improve morbidity and mortality.
Lipid-lowering therapy improves CV outcomes in patients with IHD and elevated lipids.
Lipid-lowering therapy improves CV outcomes in patients with IHD and average cholesterol.
Gemfibrozil improves outcomes in patients with IHD and low high-density lipoproteins – cholesterol (HDL-C).

Medical Therapies for IHD Patients with LV Dysfunction

Recommended Medications
ACE inhibitors improve morbidity and mortality in patients with CHF or low EF.
Asymptomatic patients, but with low EF, experience survival benefit from ACE inhibitors.
Doses of ACE inhibitors should be equivalent to 20 mg enalapril qd to obtain greatest benefit.
Beta-blockers should be considered for all patients with NYHA class II or III CHF, and EF<0.40, after stabilization on ACE inhibitors.
Addition of spironolactone to ACE inhibitors and diuretics in patients with severe heart failure improves morbidity and mortality.
Digoxin use in heart failure (EF<0.45) does not affect mortality, but decreases hospitalization due to heart failure.
Diuretics improve symptoms of volume overload.

Adjust Angina Management, if Indicated

Ensure the patient is on optimal anti-anginal therapies.

- Beta-adrenergic blocking agents are generally considered the first drug of choice because there is:
  - —Documented survival benefit in patients with prior MI, and
  - —Reduced morbidity from stroke and heart failure and a survival benefit in patients with hypertension

  A commonly used "rule of thumb" is to titrate the beta-blocker to angina relief or to a resting heart rate of 55 to 60.
- Calcium channel-blocking agents are equally effective as beta-adrenergic blocking agents in providing angina relief and in enhancing exercise duration to 1 mm ST-segment depression. Therefore, in patients without prior MI or hypertension, a long-acting calcium channel agent would be acceptable.
- Sublingual nitroglycerin is still the mainstay therapy for the immediate relief of angina that has been provoked by exertion or emotion.
  - —Sublingual nitroglycerin, when taken prior to an activity that commonly causes angina (e.g., walking up stairs or up hill), will often prevent the development of symptoms. Several forms of longer acting nitrates (e.g., isosorbide dinitrate and isosorbide mononitrate, and topical nitroglycerin patches) are also commonly used for prophylaxis of angina.
  - —Care must be taken to ensure a nitrate-free interval of 8 to 12 hours out of every 24 to prevent the development of tolerance.
  - —The use a nitrate preparation within 24 hours of the use of sildenafil (Viagra) may cause dangerous hypotension.

The following eponym may aid in remembering treatment elements that should be considered:

A = Aspirin and anti-anginal therapy

B = Beta-blocker and blood pressure

C = Cigarette smoking and cholesterol

D = Diet and diabetes

E = Education and exercise

NON-INVASIVE RISK EVALUATION

Assess the Risk of Future Cardiac Events

Among patients with known IHD, the risk of future fatal and non-fatal coronary events ranges from no detectable increase compared to individuals without known IHD to >50 percent per year. Knowledge of such risk is essential to planning diagnostic and treatment strategies. The incidence of complications from non-invasive risk stratification in appropriately selected candidates is extremely low. Thus, the main arguments for not performing non-invasive risk stratification include the following:

- Major morbidity limiting functional status (e.g., bed-ridden from multiple strokes)
- Major morbidity limiting life expectancy (e.g., metastatic cancer)
- Patient refusal

Non-invasive risk assessment has two components: (1) cardiac stress testing to identify patients likely to have ischemic myocardium at risk, and (2) the assessment of left ventricular function.

Cardiac Stress Test

Cardiac stress testing is indicated in the initial evaluation of all patients with known or suspected IHD (with the exceptions noted above), unless there are criteria for proceeding directly to cardiac catheterization and coronary arteriography (see Referral to Cardiology below). Patients undergoing only a submaximal exercise stress test (EST) prior to discharge for an acute myocardial infarction (AMI) should receive a symptom-limited EST at 3 to 6 weeks from discharge. Patients with evidence for inducible ischemia during risk stratification should be considered for further cardiac evaluation, such as coronary arteriography. Repeat cardiac stress testing is indicated if there has been a significant change in symptoms or decrement in exercise tolerance; however, routine periodic stress testing is not indicated.

Assessment of Left Ventricular Function (LVF) (e.g., Signs or Symptoms of CHF)

Left ventricular systolic dysfunction is one of the strongest predictors of both increased mortality and increased morbidity, including CHF and malignant arrhythmias. Pharmacologic therapy and/or revascularization can favorably affect this clinical course.

Accepted criteria for at least one assessment of LVF in patients with known CAD, include the following:

- Symptoms of CHF (e.g., orthopnea or paroxysmal nocturnal dyspnea)
- Significant impairment or recent decrement in exercise tolerance, due to dyspnea or fatigue
- Physical signs of CHF (e.g., elevated jugular venous pressure, unexplained pulmonary rales, laterally displaced point of maximal impulse, and S3 gallop)
- Cardiomegaly on chest x-ray
- History of prior MI or pathologic Q-waves on the ECG

Repeat assessment is indicated if there has been an unexplained worsening of CHF symptoms or signs or a significant decrement in exercise tolerance, due to fatigue or dyspnea. Routine reassessment of LVF in stable patients is not indicated.

It is also important to recognize that patients with normal or near-normal LVF (EF >0.40) may experience symptoms of heart failure due to diastolic LV dysfunction. Such patients may also experience symptomatic benefit from diuretics and nitrates, but there is little or no evidence of benefit from calcium channel blockers or ACE inhibitors. For specific recommendations for the treatment of diastolic heart failure, the provider is referred to the ACC/AHA Task Force on Practice Guidelines, Guidelines for the evaluation and management of heart failure (1995).

Select the most appropriate method for the assessment of LV systolic function. LV systolic function may be assessed by contrast angiography at cardiac catheterization, two dimensional cardiac ultrasound, and radionuclide ventriculography.

Of note, Silver et al, (1994) developed a clinical rule to identify patients with prior MI who had LVEF $\geq$0.40. He found a positive predictive value of 98 percent in those patients who have ALL of the following characteristics:

- An interpretable ECG (no left bundle branch block (LBBB), ventricular pacing, or LVH with strain pattern)
- No prior Q-wave MI
- No history of CHF
- Index MI which is not a Q-wave anterior infarction

REFERRAL TO CARDIOLOGY

With only a few exceptions, coronary angiography is generally not indicated in asymptomatic or mildly symptomatic patients with either known or suspected CAD, unless non-invasive testing reveals findings that suggest a high risk for adverse outcomes. Also, some patients with extenuating circumstances should not be routinely referred to cardiology. These general circumstances include the following:

- Review of prior coronary angiogram by current clinician shows disease not amenable to revascularization by current standards.
- Patient refusal of catheterization and/or revascularization and/or patient and physician prefer medical therapy alone, without further evaluation.
- Non-cardiac disease with projected life expectancy <6 months or quality of life unlikely to be improved by revascularization.

The following indications for referral to a cardiologist apply only to patients with stable IHD, and not to those with a current or recent ACS, in whom different criteria apply.

- Patients with Canadian Class 3-4 symptoms of ischemia or heart failure on medical therapy.
- Patients dissatisfied with symptoms despite maximal medical therapy.
- Patients with recurrent symptoms following recent (<6 mo) revascularization.
- Patients at Increased Risk for Sudden Cardiac Death
- Patients with High-Risk Findings on Non-Invasive Testing
- Patients with non-invasive test results that are inadequate for management.

Increased Risk for Sudden Cardiac Death:

Patients with increased risk for sudden cardiac death would benefit either from an electrophysiologic (EP) study and/or EP therapy, include:

—History of risk of sudden cardiac death

—History of sustained monomorphic ventricular tachycardia

—Reduced LVF (EF<0.40) and nonsustained ventricular tachycardia

—Reduced LVF (EF<0.40) and syncope of undetermined etiology

High-Risk Findings on Non-Invasive Testing:

—Severe resting left ventricular dysfunction (LVEF<35%)

—High-risk Duke treadmill score (score ≤ -11)

—Severe exercise left ventricular dysfunction (exercise LVEF<35%)

—Stress-induced large perfusion defect (particularly if anterior)

—Stress-induced moderate-size multiple perfusion defects

—Large, fixed perfusion defect with left ventricular dilatation or increased lung uptake (201Tl)

—Stress-induced moderate-size perfusion defect with left-ventricular dilatation or increased lung uptake (201Tl)

—Echocardiographic wall motion abnormality (involving >2 segments) developing at low dose of dobutamine (10 mg, · kg-1, · min-1) or at a low heart rate (<120 bpm)

—Stress echocardiographic evidence of extensive ischemia

Consideration for bypass surgery:

Patients with results from coronary angiography that suggest the need for coronary bypass surgery, but which have not been addressed to the satisfaction of the patient or provider. Patients with the following coronary anatomic findings warrant consideration for bypass surgery:

—Significant left main coronary artery stenosis

—Left main equivalent: significant (70 percent) stenosis of proximal LAD and proximal left circumflex artery

—Three-vessel disease (Survival benefit is greater in patients with abnormal LV function; e.g., with an EF <0.50.)

—Proximal LAD stenosis with 1- or 2-vessel disease

SECONDARY PREVENTION FOR IHD

Patient with Prior MI

Patients with prior MI, treated with adequate doses of beta-blockers, have reduction in recurrent coronary events and mortality. Every effort should be made to use beta-blockers in patients with MI. Physicians may overrate contraindications to using beta-blockers in post-MI patients (i.e., diabetes, lower EF, depression, and chronic obstructive pulmonary disease (COPD)). In fact, observational data analyses suggest that patients with diabetes and lower EF may have a survival benefit from beta-blockers post-MI, and patients with COPD can often tolerate beta-blockers. The association between depression and beta-blockers has been questioned. In general, the decision to avoid beta-blockers, based on theoretical concerns, should be carefully weighed against the overwhelming evidence supporting their use in patients with CAD.

Treatment of Dyslipidemia:

Initiate Statin for LDL-C >130 mg/dL; Treatment Goal LDL-C <120 mg/dl. Initiate Gemfibrozil for LDL-C <130 mg/dL (on no 'statin) and HDL-C <40 mg/dL.

- ***Initial Therapy:*** Evidence clearly supports initiation of pharmacotherapy when LDL is >130 mg/dL in patients with CHD (Scandinavian Simvastatin Survival Study Group [4S], 1994). For CHD and CHD equivalents (i.e., type 2 DM) and patients with HDL >40 mg/dL and LDL <130 mg/dL, there is insufficient evidence on which to base a recommendation for pharmacotherapy. Individual clinicians may choose to initiate drug therapy for LDL >100mg/dL for secondary CHD prevention, based on consensus opinion. However, the CARE study, a prospective secondary prevention trial, found no outcomes benefit when high-dose pravastatin was initiated at a baseline LDL < 125mg/dL (Sacks, 1996).
- ***Choice of Drug:*** Statins are the best studied and show most benefit, in terms of absolute LDL reduction and patient outcome. Older trials with niacin and bile acid resins have shown modest reduction in LDL (10 to 20 percent) and CHD event rates, with some evidence of small mortality benefit. Fibrates, which have minimal effect on LDL, have shown reduced CHD event rates but not mortality (Frick et al., 1987; Rubins et al., 1999). Statin-based outcome trials have included lovastatin, pravastatin, and simvastatin. There is no convincing evidence that one statin is better than another. Choice and starting dose should be dictated by the required LDL reduction, as statins differ in their potency. The dose should be adjusted at six to eight week intervals until the LDL reduction goal is achieved.
- ***Aggressiveness of LDL Reduction:*** There is no direct evidence from RCTs that demonstrates a net benefit (in terms of clinically relevant endpoints) of treating to an LDL goal of less than 130 mg/dL. Indirect evidence from the 4S Trial (1994) demonstrated that in patients with previous CHD, treated with simvastatin to an average LDL of 118 mg/dL, the benefits clearly outweighed the harms. NCEP III recommends lowering LDL to <100 mg/dL in the secondary CHD and CHD equivalents (i.e., type 2 diabetes mellitus) prevention setting. Trials are now underway to determine whether even more aggressive treatment produces additional benefit. An angiographic trial in coronary artery bypass grafting (CABG) patients showed that patients treated to a target LDL <140mg/dL had worse outcomes than those treated more aggressively to a target LDL <85mg/dL (Post CABG Trial, 1997). After four years, angiographic progression for the aggressive and moderate groups was 27 percent and 39 percent, respectively. Revascularization was reduced by 29 percent in the lower LDL group. Some experts argue that it is the percentage drop in LDL, not the absolute LDL achieved, that is important in achieving benefit. Treating to New Targets (TNT) is a five year RCT currently under way looking at lowering LDL to very low target levels in patients with CHD, who are randomizing to atorvastatin 10 mg versus 80 mg/day. The results of the 4S Trial suggest that there may be additional benefits of lowering LDL to less than 130 mg/dL. The VA/DoD Working Group for the management of dyslipidemia recommend a treatment goal of <120 mg/dL, while waiting for a more definitive answer.

HDL Cholesterol <40 mg/dL with LDL <130 mg/dL

Large epidemiologic trials have shown that a low HDL is associated with an increased risk for cardiovascular events (Gordon, 1989). In the VA-HIT trial (1999), patients with established cardiovascular disease, an HDL <40 mg/dL and an LDL <140 mg/dL were randomized to treatment with gemfibrozil versus placebo. The mean entry HDL of the treatment arm was 32 mg/dL and the mean entry LDL level was 111 mg/dL. Following a mean follow-up of five years, the gemfibrozil treatment arm saw a 22 percent relative risk reduction in the combined end point of nonfatal myocardial infarction or death due to cardiovascular disease, and a 25 percent reduction in stroke. (Rubins et al., 1999) Subgroup analysis of VA-HIT strongly suggests that CHD patients with low HDL, triglycerides >200 mg/dL, hypertension, or impaired fasting glucose were particularly likely to benefit from gemfibrozil therapy. The study was not powered to detect an overall mortality benefit.

Assessment and Treatment of High Blood Pressure (>140/90)

Hypertension is a risk factor for developing cardiovascular disease, the risk increasing in proportion to the severity of the hypertension, as demonstrated in multiple observational studies. Treatment of hypertension results in reduction in coronary events, even in patients with mild hypertension or in older populations. There is evidence from hypertension trials that both diuretics and beta-adrenergic blocking agents reduce coronary events. In patients with hypertension and IHD, beta-blockers are the preferred first-line agents as they provide additional therapeutic benefit – particularly in patients with prior MI and/or angina. See the VA/DoD Clinical Practice Guideline for the Diagnosis and Management of Hypertension in the Primary Care Setting.

Promote Tobacco Use Cessation

Tobacco use is a strong risk factor for IHD. Smoking cessation is associated with significant reduction in acute cardiac syndromes. Evidence supports the effectiveness of several smoking cessation interventions, including physician recommendation, multidisciplinary clinics, and pharmacological interventions. However, in general, the better smoking cessation rates have been achieved with combinations of interventions, as compared to a single intervention alone.

Primary care providers should advise every patient who smokes about the potential adverse medical consequences associated with tobacco use and counsel them to quit. Detailed recommendations can be found in the VA/DoD Clinical Practice Guideline To Promote Tobacco Use Cessation in the Primary Care Setting.

Management of Diabetes Mellitus (DM)

Achieve tight glycemic control to reduce macrovascular events and achieve microvascular benefits. Patients with diabetes are at increased risk for adverse cardiovascular events, with rates of MI similar to that of patients with known IHD. Microvascular complications, such as retinopathy and nephropathy, are decreased with improving glycemic control. There is conflicting evidence on whether tight glycemic control reduces macrovascular events, such as MI and stroke. Tight control of glucose in both type 1 and type 2 diabetes is recommended because of potential reduction of macrovascular events and proven microvascular benefits.

Screen for Depression

Identify patients who also have depression and initiate therapy or referral for therapy. Depression is prevalent in patients with IHD and is independently associated with a worse prognosis. There is efficacious treatment available for depression. It is not known whether the treatment of depression improves CV outcomes, though it is known that such treatment improves compliance with efficacious therapies. There are several available tools to screen for depression in the primary care setting. See the VA/DoD Clinical Practice Guideline for the Management of Major Depressive Disorder in Adults for a discussion of depression screening. As an example, the PRIME MD efficiently screens for criteria-based DSM IV diagnosis of depressive disorders.

Exercise Rehabilitation Program

Consider cardiac rehabilitation as secondary prevention. The benefits of a multi-factorial approach to CV risk-factor management, such as found in a cardiac rehabilitation program, include the following:

- Improvement in exercise tolerance and anginal symptoms
- A more favorable blood lipid profile
- Reduced stress and improved psychosocial well-being
- Reduction in cigarette smoking

Regular Follow-Up

Appropriate follow-up of the patient with IHD will vary for the individual patient. Many patients on a stable medical regimen can be followed on a 6 to 12 month basis. Other patients, however, will need more frequent follow-up to encourage risk-factor modification, assess efficacy of medical regimen, and follow appropriate laboratory tests (e.g., lipids, electrolytes and renal function, and drug levels).

Consider Medical Nutrition Therapy (MNT) by a registered dietician or nutrition professional for clinical nutrition assessment and provision of appropriate nutrition therapy. There are other sources for "heart-healthy" diets, including the American Heart Association (see http://www. deliciousdecisions.org).